

89. When a Dental patient is taking a nonselective B blocker, it is important to use caution because:
- There is a maximum limit of 0.054mg of epinephrine due to a potential increase in blood pressure
 - There is a maximum limit of 0.054mg of epinephrine due to a potential compensatory decrease in blood pressure
 - There is a maximum limit of 0.036mg of epinephrine due to a potential increase of blood pressure
 - There is a maximum limit of 0.036mg of epinephrine due to a potential compensatory decrease in blood pressure

ANSWER C.

BETA BLOCKERS (BBs)			
Nonselective	Nonselective—	Taste changes, lichenoid reactions	Avoid prolonged use of NSAIDs—May reduce antihypertensive effects
Propranolol (Inderal)	Potential increase in blood pressure (use maximum of 0.036 mg epinephrine or 0.20 mg levonordefrin)		
Timolol (Blocadren)			
Nadolol (Corgard)			
Pindolol (Visken)			
Penbutolol (Levatol)			
Carteolol (Cartrol)			
Cardioselective	Cardioselective—Normal use		
Metoprolol (Lopressor)			
Acebutolol (Sectral)			
Atenolol (Tenormin)			
Betaxolol (Kerlone)			
Bisoprolol (Zebeta)			
COMBINED ALPHA AND BETA BLOCKERS			
Carvedilol (Coreg)	Because both beta ₁ and beta ₂ receptor sites are blocked, the potential for an adverse interaction is present; however, it is unlikely to occur because of compensatory alpha receptor blockade	Taste changes	Orthostatic hypotension; avoid prolonged use of NSAIDs—May reduce antihypertensive effects
Labetalol (Normodyne, Trandate)			

Little et al. *Dental management of the medically compromised patient*; 7th edition, pg 40.

90. Sialadenitis may be due to a viral or bacterial infection. Most cases of acute bacterial Sialadenitis are caused by:

- Spirochetes*
- Streptococcus pneumonia*
- Actinomyces israelii*
- Staphylococcus aureus*

Answer: D. *Staphylococcus aureus*

Sialadenitis can arise from various infectious and non-infectious causes. The most common viral infection is Mumps, although a number of other viruses also can involve the salivary gland, including Coxsackie A. Most bacterial infections arise as a result of ductal obstruction or decreased salivary flow, allowing retrograde spread of bacteria throughout the ductal system. Blockage of the duct can be caused by *Sialolithiasis*, congenital stricture, or compression by an adjacent tumor. Medications that produce xerostomia can predispose patients to such an

infection. Most cases of acute bacterial *Sialadenitis* are caused by *Staphylococcus aureus*, but they also may arise from streptococci or other organisms.

Neville, Damm, Allen, Bouquot, "Oral and Maxillofacial Pathology", third edition, 2009.

91. The etiology of pregnancy gingivitis has been suggested to occur due to

- A. An altered response to local factors
- B. elevations in systemic levels of estradiol and progesterone
- C. subgingival flora changes to a more anaerobic flora as pregnancy progresses
- D. a depression of the maternal T-lymphocyte response
- E. a significant increase in *P. Intermedia*
- F. all of the above

Answer F.

Pregnancy itself does not cause gingivitis. Gingivitis in pregnancy is caused by bacterial plaque, just as it is in non-pregnant individuals. Pregnancy accentuates the gingival response to plaque and modifies the resultant clinical picture. No notable changes occur in gingiva during pregnancy in the absence of local factors.

The severity of gingivitis is increased during pregnancy beginning in the second or third month. Patients with slight chronic gingivitis that attracted no particular attention before the pregnancy become aware of the gingiva because previously inflamed areas become enlarge edematous and more notable discolored.

Gingivitis becomes more severe by the eighth month and decreased during the ninth; plaque accumulation follows a similar pattern. The correlation between gingivitis and the quantity of plaque is greater after parturition than during pregnancy, which suggests that pregnancy introduces other factors that aggravate the gingival response to local factors.

The possibility that bacterial-hormonal interactions may change the composition of plaque and lead to gingival inflammation has not been extensively explored. Kornman and Loesche have reported that the subgingival flora changes to a more anaerobic flora as pregnancy progresses; the only microorganism that increases significantly during pregnancy is *P. intermedia*. This increase appears to be associated with elevations in systemic levels of estradiol and progesterone and to coincide with the peak in gingival bleeding. It has also been suggested that during pregnancy a depression of the maternal T-lymphocyte response may be a factor in the altered tissue response to plaque.

The aggravation of gingivitis in pregnancy has been attributed principally to the increased levels of progesterone, which produce dilation and tortuosity of the gingival microvasculature, circulatory stasis, and increased susceptibility to mechanical irritation, all of which favor leakage of fluid into the perivascular tissue. A marked increase in estrogen and progesterone occurs during pregnancy, with a reduction after parturition. The severity of gingivitis varies with the hormonal levels in pregnancy.

It has also been suggested that the accentuation of gingivitis in pregnancy occurs in two peaks: during the first trimester, when there is overproduction of gonadotropins, and during the third trimester, when estrogen and progesterone levels are highest. Destruction of gingival mast cells by the increased sex hormones and the resultant release of histamine and proteolytic enzymes may also contribute to the exaggerated inflammatory response to local factors.

Carranza's Clinical Periodontology 9th edition, 212-214

92. Which of the following is not a side effect of birth Control Pills?

- A. Melasma
- B. Exaggerated gingival inflammatory response
- C. Dysguesia
- D. Chloasma

ANSWER: C. Dysguesia

Hormonal changes resulting from puberty, menstruation, and birth control pills may affect oral tissues. The major changes are associated with an exaggerated gingival inflammatory response to local factors. These are usually well controlled by adequate oral hygiene measures.

Sonis, Stephen T. Principles and Practice of Oral Medicine, 2nd Edition. W.B. Saunders Company, 1994.

Birth control pills — can cause melasma, a diffuse macular melanosis of the perioral and periorbital facial skin

Eversole, Lewis R. Oral Medicine: A Pocket Guide. W.B. Saunders Company, 1995.

93. The following are appropriate measures to undertake with a patient that presents to your dental office with clinically active tuberculosis with a positive sputum test, except:

- A. Perform urgent care that requires the use of a handpiece in a hospital setting with special ventilation and appropriate isolation
- B. Treat the patient with consistently negative sputum as a normal patient
- C. Treat patients under the age of 6 as normal patients (noninfectious after consultation with physician to verify status)
- D. The patient can be treated in an outpatient setting after receiving chemotherapy for 2-3 weeks with a noninfectious confirmation from their physician and without any complicating factors
- E. All of the above are appropriate measures

Answer: F. All of the above are appropriate measures

All of the above are correct. A child with active TB who is receiving chemotherapy usually can be treated as an outpatient because bacilli are found only rarely in the sputum of children. The child should be considered noninfectious unless a positive sputum culture has been obtained. Reasons why a child with TB is considered noninfectious include the rarity of cavitory disease in children and their inability to cough up sputum effectively. In this instance, defining exactly what age constitutes a 'child' is difficult. *As a general rule, children younger than 6 can be confidently treated.* Over the age of 6 a physician should be consulted prior to treatment. Of greater concern is the family because the disease was probably contracted by an adult; all family members should provide a history of skin testing and chest x-rays to rule out the possibility of active disease.

Little, Falace, Miller, Rhodus. Dental Management of the Medically Compromised Patient. 7th ed.

<http://www.cdc.gov/mmwr/PDF/RR/RR4313.pdf>

94. Arthrography has many advantages for visualizing the TMJ except_____.

- A. Helps to visualize soft tissue shape and position
- B. Through the fluoroscope, the clinician can visualize the dynamic movements of the disc and condyle
- C. Perforations of the disc can be visualized
- D. This technique is considered noninvasive

Answer D. This technique is considered noninvasive

Arthrography is when a contrast medium is injected into the joint spaces to outline important soft tissue structures. This helps visualize the shape and position of the soft tissue. Through the fluoroscope, the clinician can also visualize the dynamic movements of the disc and condyle. Perforations of the disc can also be visualized with the injection of the contrast. TMJ arthrograms, however, have several disadvantages. **They are expensive, they are invasive, and they expose the patient to relatively high levels of radiation.** Because the TMJs contain only a small amount of synovial fluid, the injection of contrast medium into the joint spaces causes a ballooning effect of the capsule that tends to separate the articular surfaces.

Okeson JP. Management of Temporomandibular Disorders and Occlusion 5th edition. Mosby Inc, 2003.

95. What diagnostic criteria must be present to diagnose a TMJ dislocation?

- a. Inability to open the mouth beyond 10mm; CT evidence that indicates the disc is anterior to the condyle.
- b. Inability to close the mouth without manipulation; Radiographic evidence reveals the condyle is anterior to the eminence.
- c. Inability to close the mouth even with manipulation; Radiographic evidence that the condyle is stuck on the eminence.
- d. Inability to open the mouth beyond 20mm; CT evidence that the disc and condyle is anterior to the eminence.

ANSWER b.

Diagnostic criteria for TMJ dislocation. All of the following must present:

- 1. Inability to close the mouth without a specific manipulative maneuver.
- 2. Radiographic evidence reveals the condyle is well beyond the eminence.

De Leeuw, Orofacial Pain, 4th edition; pg 148

TMJ dislocation – AKA open lock or subluxation, TMJ dislocation is a condition in which the condyle is positioned anterior to the articular eminence and is unable to return to a closed position. It is manifested clinically as an inability to close the mouth. Dislocation may be the result of physical jamming of the disc-condyle complex beyond the articular eminence that is maintained by muscle activity, or a true hyperextension of the disc-condyle complex beyond its normal maximum translation position. The duration of dislocation may be momentary or prolonged. When prolonged, the patient may need the clinician's assistance to reduce the dislocation and normalize mandibular function. There is usually clinical history of excessive range of motion that is not painful, but pain can occur at the time of dislocation, with residual pain following the episode.

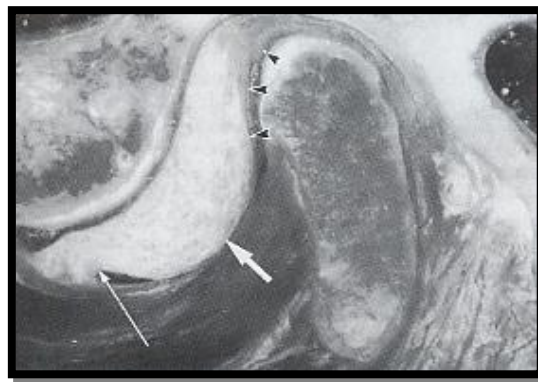
Diff Dx: Fracture

96. Characteristics of an anteriorly displaced disc include all of the following EXCEPT:

- A. Shortening of the capsular and discal ligaments
- B. Jaw deviates to the affected side on opening
- C. Condyle articulates on the retrodiscal tissues
- D. May present as a dislocation with or without closed lock

Answer: A. Shortening of the capsular and discal ligaments

Ligaments are elongated, allowing the disc to be dislocated through the discal space. Joint sounds are detected in 25-35% of patients. Not all joint sounds are progressive. Only joint sounds associated with pain should be considered for treatment. In an anteriorly displaced disc, the condyle articulates on the posterior border of the disc.



**Anterior Disc Displacement
without Reduction**

“ Closed Lock “

- Anteriorly displaced disc with head of condyle off the disc and trapped posterior to it
- Patient can rotate but not translate
- Persistent limited ROM (25-35mm)
- Normal ipsi-lateral excursive, restricted contra-lateral excursive
- Can be Acute or Chronic
- Deviation to the affected side on opening

**Anterior Disc Displacement
with Reduction**

- Disc is in anteromedial position
- Periauricular pain caused by joint movement
- May have joint noises but ROM not restricted
- Patient may be able to reduce joint but difficult if muscle go into spasm

Okeson, “Management of temporomandibular disorders and occlusion”, fifth edition, 2003.

97. Which nevus has a predilection for the dorsa of the hands and feet, the scalp and the face; has oral lesions found almost always on the palate, and usually occurs in children and young adults, with a female predilection.

- a. Congenital blue nevus
- b. halo Nevus
- c. Benign juvenile melanoma
- d. Blue nevus

Answer D

Variants of melanocytic nevus

Clinical features of congenital melanocytic nevus: The small congenital nevus may be similar in appearance to an acquired melanocytic nevus, but is frequently larger in diameter. The large congenital lesion classically appears as a brown to black plaque, usually with a rough surface or multiple nodular areas. However, the clinic appearance often changes with time. Early lesions are flat and light tan, becoming elevated, rougher, and darker with age. A common feature is the presence of hypertrichosis (excess hair) within the lesion, which may become more prominent with age (giant hairy nevus). A very large congenital nevus sometimes may be referred to as bathing trunk nevus or garment nevus, because it gives the appearance of the patient wearing an article of clothing.



Clinical features of Halo nevus: The halo nevus is typically an isolated

phenomenon associated with a preexisting acquired melanocytic nevus. It is most common on the skin of the trunk during the second decade of life. The lesion typically appears as a central pigmented papule or macule, surrounded by a uniform, 2-to 3-mm zone of hypopigmentation. Sometimes this peripheral zone is much wider.



Spitz Neuvs (Benign juvenile melanoma: spindle and epithelioid cell nevus): The Spitz nevus typically develops on the skin of the extremities or the face during childhood. It appears as a solitary dome-shaped, pink to reddish-brown papule, usually smaller than 6mm in greatest diameter. The young age at presentation and the relatively small size of the Spitz nevus are useful features to help distinguish it from melanoma.



Blue Nevus (Dermal Melanocytoma: Jadassohn-Tieche Nevus) clinical features: The common blue nevus may affect any cutaneous or mucosal site, but it has a predilection for the dorsa of the hands and feet, the scalp and the face. Oral lesions are found almost always on the palate. The lesion usually occurs in children and young adults, and a female predilection is seen. It appears as a macular or dome-shaped, blue or blue-black lesion smaller than 1cm in diameter.

The cellular blue nevus is much less common and usually develops during the second to fourth decades of life, but it may be congenital. More than 50% of cellular blue nevi arise in the sacrococcygeal or buttock region, although they may be seen on other cutaneous or mucosal surfaces. Clinically, this nevus appears as a slow-growing, blue-black papule or nodule that sometimes attains a size of 2cm or more. Occasional lesions remain macular.



Oral and Maxillofacial Pathology; Neville etc. p 335-336

Photos courtesy of the internet

98. Which of the following radiographic appearances would you expect to see in a patient with untreated Hyperparathyroidism?

- A. ground-glass appearance and loss of lamina dura
- B. step-ladder appearance and loss of lamina dura
- C. ground-glass appearance and thickening of lamina dura
- D. step-ladder appearance and thickening of lamina dura

ANSWER: A. ground-glass appearance and loss of lamina dura

Generally, oral changes associated with hyperparathyroidism occur when the disease is fairly advanced. It is unusual for oral changes to be the presenting sign of the disease. As expected, the oral changes of hyperparathyroidism reflect alterations in calcium metabolism. Classically, loss of the lamina dura is cited as a significant oral finding. Additionally, patients may demonstrate an altered trabecular pattern of bone characterized as having a ground-glass appearance. Intrabony and extrabony giant cell tumors may form.

Sonis, Stephen T.. Principles and Practice of Oral Medicine, 2nd Edition. W.B. Saunders Company, 1994.

99. Which of the following clinical features associated with the adenomatoid odontogenic tumor (AOT) is true:

- A. Approximately 2/3 of all cases are diagnosed in patients that are 20-29 years old
- B. The AOT is found twice as often in the mandible than in the maxilla
- C. Females are affected about twice as often as males
- D. In 75% of cases the tumor is a circumscribed radiolucency that involves the crown of an unerupted tooth, usually an incisor
- E. The AOT is malignant and enucleation from bone is extremely difficult

Answer: C. Females are affected about twice as often as males

The AOT is dubbed by some as the “2/3’s tumor”. Approximately 2/3 of all cases are diagnosed in patients that are 10-19 years old & the AOT is usually located in the anterior and it is found twice as often in the maxilla than in the mandible. Females are affected about twice as often as males. In 75% of cases the tumor is a circumscribed radiolucency that involved the crown of an unerupted tooth, usually a canine. The AOT is benign and enucleation from bone is usually easy due to the capsule that surrounds it.

Neville, Damm, Allen, Bouquot. Oral and Maxillofacial Pathology, 3rd edition.

100. A 37 year African American female presents to your dental clinic for routine evaluation. You are developing a full mouth series of radiographs when you notice the radiograph below. The lesion is isolated to this region only with no expansion noted. The patient denies any pain or discomfort. The endodontic evaluation reports normal pulp with normal apical periodontal ligaments. Which would be your first choice on your differential diagnosis?



- A. Focal Cemento-osseous Dysplasia
- B. Cemento-ossifying Fibroma
- C. Periapical Cemento-osseous Dysplasia
- D. Periapical granuloma

101. Which statement concerning the lingual thyroid is true?

- a. Accounts for 90% of ectopic thyroid tissue; Can enlarge and block the airway
- b. Accounts for less than 10% of ectopic thyroid tissue; Does not enlarge and block the airway
- c. Lingual area is the only site for ectopic Thyroid tissue; Should be prophylactically removed
- d. Can be disregarded, because it never results in any symptoms.

ANSWER: A. Accounts for 90% of ectopic thyroid tissue; More commonly symptomatic in females; Can enlarge and block the airway

If the primitive gland at the junction of the anterior two thirds and posterior third of the tongue does not descend normally in the 7th week of embryonic life, a lingual thyroid will result. It accounts for 90% of all ectopic thyroids. Equal distributed between males and females (about 10%). However, clinically evident or symptomatic lingual thyroids are 4-7 times more common in females. In 70%, a lingual thyroid will be the patient's only thyroid tissue. Lingual thyroids can range from small, asymptomatic, nodular lesions to large masses that can block the airway. The most common clinical symptoms are dysphagia, dysphonia and dyspnea. No treatment except periodic follow-up is required for patients who are asymptomatic. In symptomatic patients, suppressive therapy with supplemental thyroid hormone often can reduce the size of the lesion.

Neville and Damm. Oral and Maxillofacial Pathology. 3rd edition. Pg 12-13.

102. The most significant aspect of Multiple Endocrine Neoplasia (MEN) type 2B syndrome is the development of:

- A. Marfanoid body and muscle wasting
- B. Mucosal neuromas
- C. Medullary thyroid carcinoma
- D. Adrenal pheochromocytomas

Answer: C. Medullary thyroid carcinoma

MEN syndromes are characterized by tumors or hyperplasia of the neuroendocrine tissue. Oral manifestations are most common in type 2B. This condition is typically associated with mucosal neuromas, Medullary thyroid carcinoma, Adrenal pheochromocytomas and a Marfanoid body build characterized by thin, elongated limbs with muscle wasting. The most significant aspect of MEN 2B syndrome is the development of Medullary carcinoma of the thyroid gland which occurs in more than 90% of cases.

Neville, Damm, Allen, Bouquot, "Oral and Maxillofacial Pathology", third ed. 2009.

103. Stevens-Johnson syndrome is

- A. A less severe form of the disease, known as erythema multiforme
- B. usually triggered by an infection rather than a drug
- C. For a diagnosis to be made, either the ocular or genital mucosae should be affected in conjunction with the oral and skin lesions.
- D. With severe ocular involvement, scarring may occur, similar to that in bullous pemphigoid.
- E. All of the above are true

Answer C.

Erythema multiforme is a blistering, ulcerative mucocutaneous condition of uncertain etiopathogenesis. The is probably an immunologically mediated process, although the cause is poorly understood. In about 50% of the cases, the clinician can identify either a preceding infection, such as herpes simplex or mycoplasma pneumoniae, or exposure of anyone of a variety of drugs and medications, particularly antibiotics or analgesics.

Erythema multiforme usually has an acute onset and may display a wide spectrum of clinical disease. On the mild end of the spectrum, ulcerations develop, affecting the oral mucosa primarily. In its most severe form, diffuse, sloughing and ulceration of the entire skin and mucosal surfaces may be seen (toxic epidermal necrolysis or Lyell's disease)

A more severe form of the disease, known as erythema multiforme major or Stevens-Johnson syndrome is usually triggered by a drug rather than an infection. For such a diagnosis to be made, either the ocular or genital mucosae should be affected in conjunction with the oral and skin lesions. With severe ocular involvement, scarring may occur, similar to that in cicatricial pemphigoid.

Oral and Maxillofacial Pathology 2nd edition Neville and Damm, p.677

104. Which of the following developmental abnormalities exhibits primary and permanent teeth with reddish brown to gray opalescent color?

- A. Dentin Dysplasia Type I
- B. Dentin Dysplasia Type II
- C. Amelogenesis Imperfecta
- D. Dentinogenesis Imperfecta

ANSWER: D. Dentinogenesis Imperfecta

The clinical picture of dentinogenesis imperfecta is one in which the primary and permanent teeth are a characteristic reddish brown to gray opalescent color. Soon after the primary dentition is complete, enamel often breaks away from the incisal edge of the anterior teeth and the occlusal surface of the posterior teeth. The exposed soft dentin abrades rapidly, occasionally to the extent that the smooth, polished dentin surface is continuous with the gingival tissue. Radiographs show slender roots and bulbous crowns. The pulp chamber is small or entirely absent, and the pulp canals are small and ribbonlike. Multiple root fractures are often seen, particularly in older patients. Crowns of the permanent teeth often seem to be of better quality and have less destruction. Occasionally they appear essentially normal clinically

In Amelogenesis Imperfecta defective tooth structure is limited to the enamel. On radiographic examination the pulpal outline appears to be normal, and the root morphology is not unlike that of normal teeth. The difference in the appearance and quality of the enamel is thought to be attributable to the state of enamel development at the time the defect occurs. In the hypoplastic type the enamel matrix appears to be imperfectly formed; although calcification subsequently occurs in the matrix and the enamel is hard, it is defective in amount and has a roughened, pitted surface. In the hypocalcified type, matrix formation appears to be of normal thickness, but calcification is deficient and the enamel is soft.

Both primary and secondary dentitions are affected in dentin dysplasia type I, which is inherited as an autosomal dominant trait. Radiographically the roots are short and may be more pointed than normal. Usually the root canals and pulp chambers are absent except for a chevron-shaped remnant in the crown. The color and general morphology of the crowns of the teeth are usually normal, although they may be slightly opalescent and blue or brown. Periapical

radiolucencies may be present at the apices of affected teeth.

Dentin dysplasia type II is inherited as an autosomal dominant trait in which the primary dentition appears opalescent and on radiographs has obliterated pulp chambers, similar to the appearance in dentinogenesis imperfecta. Unlike in dentinogenesis imperfecta, however, in dentin dysplasia type II the permanent dentition has normal color and radiographically exhibits a thistle tube pulp configuration with pulp stones.

McDonald, Ralph. Dentistry for the Child and Adolescent, 8th Edition. Mosby, 2004.

105. The following are true regarding fibrous dysplasia (FD) of the jaws except:

- A. In many cases, the disease tends to stabilize and stops enlarging when skeletal maturation is reached
- B. An estimated 25-50% of patients show some re-growth after surgical 'shave-down' procedures to correct deformities in younger patients
- C. Malignant changes are uncommon in patients with FD
- D. Radiation therapy is a suggested form of treatment to reduce the size of FD lesions

Answer: D. Radiation therapy is a suggested form of treatment to reduce the size of FD lesions

All of the above are true except Answer D because radiation therapy is **contraindicated** in these patients because it carries the risk for development of postirradiation bone sarcoma.

Due to the regrowth potential associated with FD, many surgeons believe that surgical correction should be carried out after skeletal maturation and should be delayed as long as possible.

FD is a developmental fibro-osseous lesion and is characterized by replacement of normal bone by an excessive proliferation of cellular fibrous connective tissue intermixed with irregular bony trabeculae. When the disease is limited to a single bone it is termed **monostotic fibrous dysplasia** and this type accounts for 80-85% of cases, with the jaws being the most commonly affected, with males and females being affected equally. A painless swelling is the most common feature with slow growth. FD may grow fast & the maxilla is involved more than the mandible.

Chief radiographic feature is a fine "**ground-glass**" opacification of the bone with margins that are ill-defined.

Involvement of 2 or more bones is termed **polyostotic fibrous dysplasia**. The number of bones involved ranges from a few to about 75% of the skeleton. Patients with **Jaffe-Lichenstein syndrome** have polyostotic FD and **café-au-lait pigmentation** of the skin (coast of Maine). Patients that have the 2 features of J-L syndrome with multiple **endocrinopathies** are said to have **McCune-Albright syndrome**. Sexual precocity is the most common endocrinopathy, particularly in females.

Bones more commonly associated with polyostotic FD are the long bones with pathological fractures resulting in deformities being reported (hockey stick deformity of the femur). **Hypophosphatemia** caused by renal phosphate wasting is common in these patients.

Histologically, irregularly shaped trabeculae of immature woven bone is common. Sometimes referred to as *Chinese script writing*.

Neville, Damm, Allen, Bouquot. Oral and Maxillofacial Pathology, 3rd edition.

106. When the patient experiences a reciprocal click upon opening and closing on the right side, the patient would potentially be experiencing:

- A. Right side anterior disc displacement without reduction
- B. Left side anterior disc displacement without reduction
- C. Right side anterior disc displacement with reduction
- D. Left side anterior disc displacement with reduction

Answer: C. Right side anterior disc displacement with reduction

Disc displacement with reduction usually is characterized by what is termed reciprocal clicking, a reciprocal noise that is heard during opening movement and again before the teeth occlude during the closing movement. The closing noise is usually of less magnitude and is thought to be produced by the re-displacement of the disc.

Okeson JP. Management of Temporomandibular Disorders and Occlusion 5th ed. Mosby Inc, 2003.